2. Safety Devices

※ We adapt 5 safety devices for users to use this wash machine safely.

1) Balancing device (ASSY-Main PCB)
   → When the lauandry is out of balance, to prevent the noises and vibrations, the unbalance detecting sensor helps the laundry laid even and continue the dehydating process.

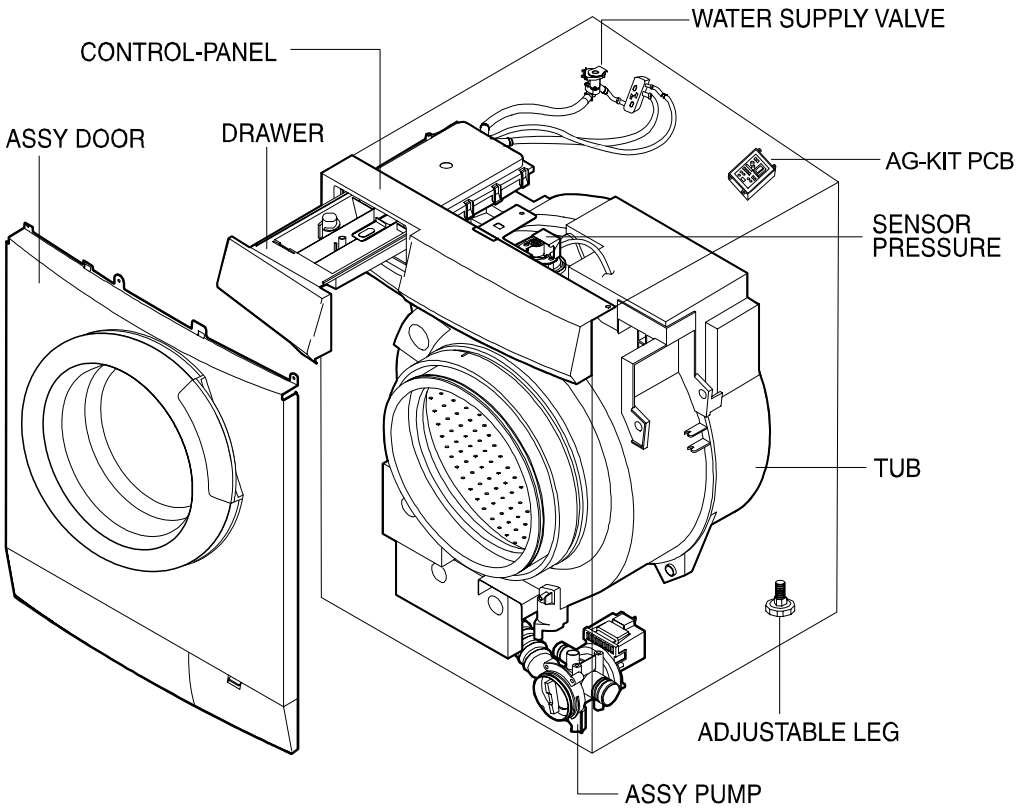
2) Anti-over water supply device
   → Because water supply valve is broken, once water is supplied to the 2/3 level of the door, the water supplied is drained automatically, Over -flow error (E3) is diplayed on the panel

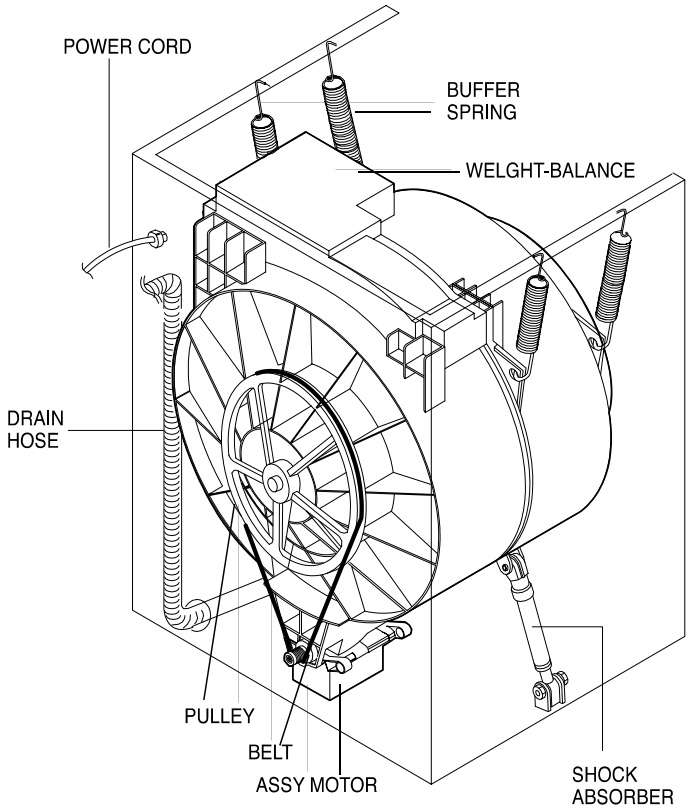
3) Temperature-regulating device(thermistor)
   → To prevent over-heating over the temperature setted up, THERMISTOR senses the temperature of the machine continuously and helps the wash machine to work at the temperature given by users.

4) Overheating- controlling system
   → Under the circumstances of THERMISTOR inferiority or abnormal condition, if wash-heater is overheated, automatically, assy -thermal fuse cuts off the power supply to protect the machine to keep it safe.

5) Delicate clothing safeguard function(ASSY-Main PCB)
   → To protect the clothings which is weak to high temperature, the wash machine senses the temperature inside the washing tub. if the temperature rises over 50℃ wool washing course and Delicate washing course display abnormal water temperature on the panel , after draining the water.

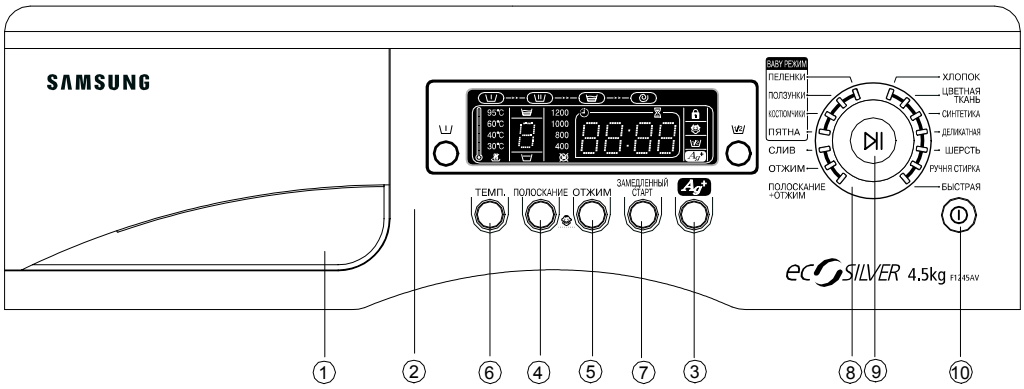
3. Overview of the Washing Machine





4. Overview of the control panel

F1245AV



1. Detergent dispenser
2. Display panel
   Displays the remaining wash cycle time and error messages.
3. Silver Nano selection button
   Silver Nano water is supplied in washing as well as the last rinse, featuring sterilization and antibacterial coating.
4. Rinse selection button
   Press the rinse button to add rinse cycles. Maximum number of rinse cycles is five.
5. Spin selection button

   Press the button repeatedly to cycle through the available spin speed options.

F1245AV	, , 400, 800, 1000, 1200 rpm	: no spin, : rinse hold

   No spin

   The laundry remains in the drum without being spun after the final drain
   Rinse Hold

   The laundry remains soaking in the final rinse water.
   Before the laundry can be unloaded, either "Drain" or the "Spin" program must be run.

6. Temperature selection button

   Press the button repeatedly to cycle through the available water temperature options (cold water( ), 30℃, 40℃ , 60℃ and 95℃).

7. Delay Start selection button

   Press the button repeatedly to cycle through the available delayed start options(from 3 hour to 24 hours in one hour increments).
   Displayed hours means the time of finished washing-cycle.

8. Fuzzy Control dial

   Turn the dial to select one of the 14 available wash programs.

Cotton, Coloureds, Synthetics, Delicates, Wool, Hand wash, Quick, Rinse+Spin, Spin, Drain, Baby Program(Stains, Delicates, Coloreds, Cotton)

9. Start/Pause selection button

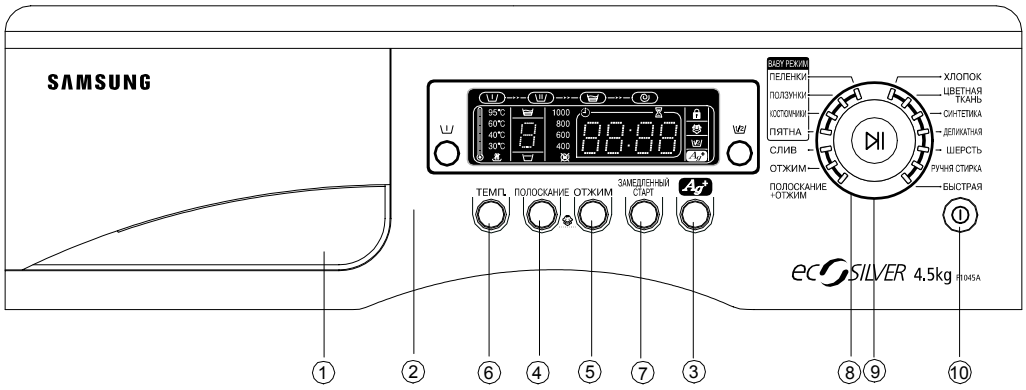
   Press to pause and restart programs.

10. ⏻ (On/Off) selection button

    Press once to turn the washing machine on, press again to turn the washing machine off. If the washing machine power is left on for longer than 10 minutes without any buttons being touched, the power automatically turns off.

4. Overview of the control panel

F1045A



1. Detergent dispenser
2. Display panel
   Displays the remaining wash cycle time and error messages.
3. Silver Nano selection button
   Silver Nano water is supplied in washing as well as the last rinse, featuring sterilization and antibacterial coating.
4. Rinse selection button
   Press the rinse button to add rinse cycles. Maximum number of rinse cycles is five.
5. Spin selection button

   Press the button repeatedly to cycle through the available spin speed options.

F1045A	⌓, ⊠, 400, 600, 800, 1000 rpm	⊠ : no spin, ⌓ : rinse hold

   No spin

   The laundry remains in the drum without being spun after the final drain
   Rinse Hold

   The laundry remains soaking in the final rinse water.
   Before the laundry can be unloaded, either “Drain” or the “Spin” program must be run.

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10. ⏻ (On/Off) selection button

    Press once to turn the washing machine on, press again to turn the washing machine off. If the washing machine power is left on for longer than 10 minutes without any buttons being touched, the power automatically turns off.

5. Main function

1) Auto power S/W off function

- After power on, the auto power S/W off function automatically switches power off for you if you do not press selection button for 10 minutes
- After selecting the function, the auto power S/W off function automatically switches power off for you if you do not press start/pause button for 10 minutes
- until 5 minutes past, After finishing the last function, the auto power S/W off function automatically switches power off for you if you do not re-select the course button or manual button

2) Door open function

- If door is open during the operating, all operating is halted, and door error message will be displayed (2-digit panel displays "Ed" 4-digit panel displays "door") and error melody will coming out
- Door open error can be cleared by closing the door. the operating keeps going on

3) Rinse hold function

- If rinse hold function selected, the operating is finished , the machine do not drain the water after last rinse

4) No spin function

- If no spin function selected, the operating is finished after last rinse

5) Drain function

- Drain function is over, after pumping out the water for 2 minutes , without motor rotating

6) Pre-washing function

- Pre-washing function can be selected ,when you choice the following mode; cotton, coloreds, sythetics, delicates, baby cotton
- Water level/reverse time is the same with the selected course
- Pre-washing takes about 15 minutes

7) Rinse+ function

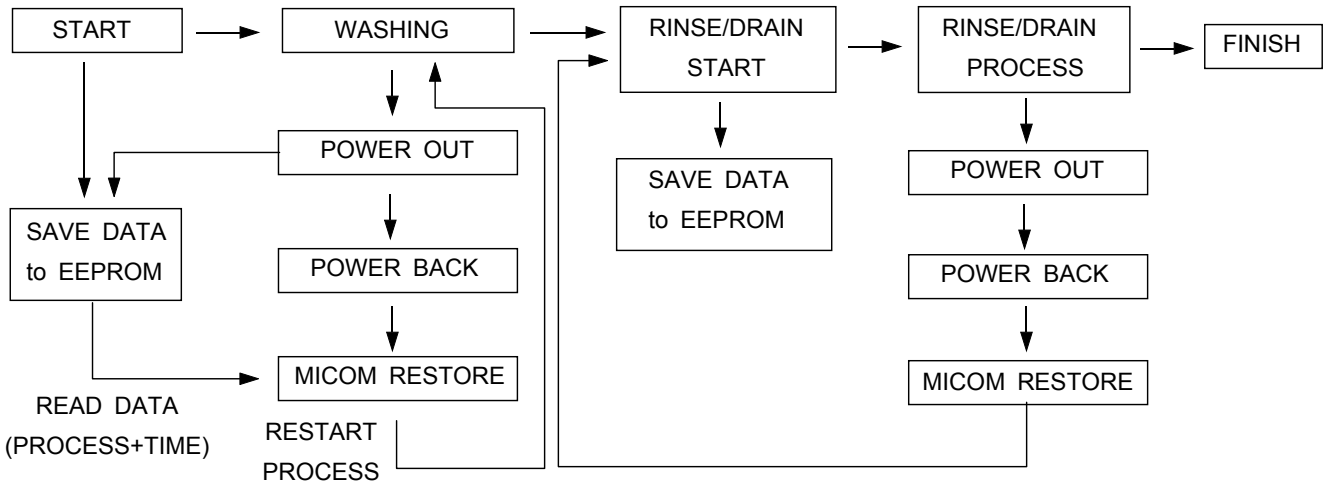
- This function practises rinse process once more

5. Main function

8) Power-out compensation function

- If power is out on selected process, the process before power out is stored to EEPROM, once power is back the process before power out continues.
- When power is back, washing process starts from the process at the point of the power out, rinse/drain process starts from the initial process.

POWER-OUT COMPENSATION FUNCTION PROCESS



9) Water heater Error function

① This function starts working, when the heater works abnormally.
(this function begins sensing the heater 2 minutes later, after the heater operating)

② The value of the initial thermistor(A1) is compared with that of the thermistor(A2) in 2 minutes (Y=A2-A1)
- For 10 minute the variance of temperature(Y) is less than 2℃ "HE2"message is displayed on the panel.

③ The value of the initial thermistor(A1) is compared with that of the thermistor(A2) in 11 minutes (Y=A2-A1)
- For 1 minute the variance of temperature(Y) increases more than 40℃(0.3V) "HE1"message is displayed on the panel.

④ At this time heater, Error "HE2 (heater do not work), HE1(overheated)" is displayed and all working process off

⑤ The heater operating continues during heating hours, if washing hour is left over, the residual washing process keeps going without heating.

5. Main function

10) Fuzzy washing function (weight-sensing)

☞ After finishing initial water supply, when the fall of the water level needs supplementary water supply, Sensing function perceives the weight with the supplementary water supply numbers and starts to work. Under the course of Cotton, or Coloureds, if the supplementary water supply numbers become 3 - 4 times the function is going at default condition (high water level), if 1-2 below that is going at middle level, if 0 below low water level, heating hours and rinse hours depend on the above data.

ECO PRE mode is selected, the process going on at default condition.

	Washing hours		Rinse water level
	Cotton	Coloureds	
High	Default	Default	Default
Middle	Default-20 min	Default-10min	23.30KHZ
Low	Default-30 min	Default-15min	23.70KHZ

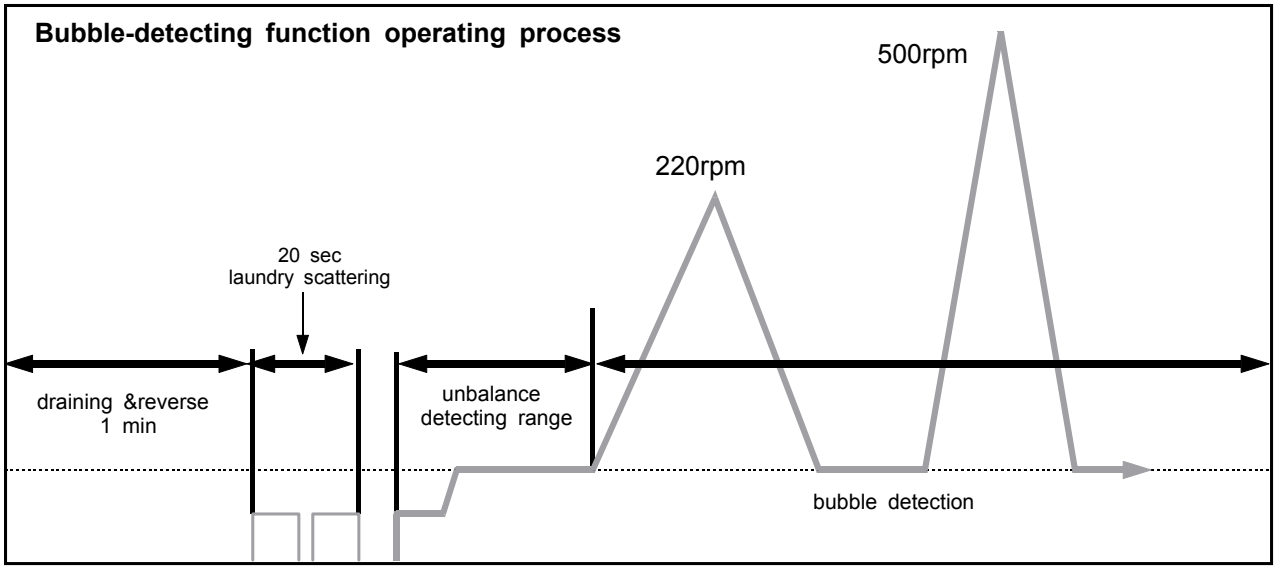
※After sensing weight, above hours is decreased from above default hours

11) Bubble -detecting function

At the each condition of washing&dehydrating , rinse&dehydrating , hydrating, bubble -detecting function works, this function works 5times normally, if the function detects bubbles at 6 times , the bubble-detecting function stops and go on to the next process.

● The bubble-detecting function during washing & dehydrating to rinse & dehydrating
after 2 times instant dehydrating and before main dehydrating, if the water level is under 25.45KHZ, Bubble
→ Detecting function thinks there are bubbles and add the bubbles-removing rinse, needing hours are above hours and 8 min 40 sec.

→ The bubble-detecting function during single hydrating process
after 2 times instant dehydrating and before main dehydrating , if the water level is 25.45KHZ below or during main dehydrating, water level data is 23.80KHZ below Bubble-detecting function thinks there are bubbles and add the bubbles-removing rinse 1 times, needing hours are above hours and 5 min 55 sec.



5. Main function

12) Unbalance detecting & laundry balance positioning system

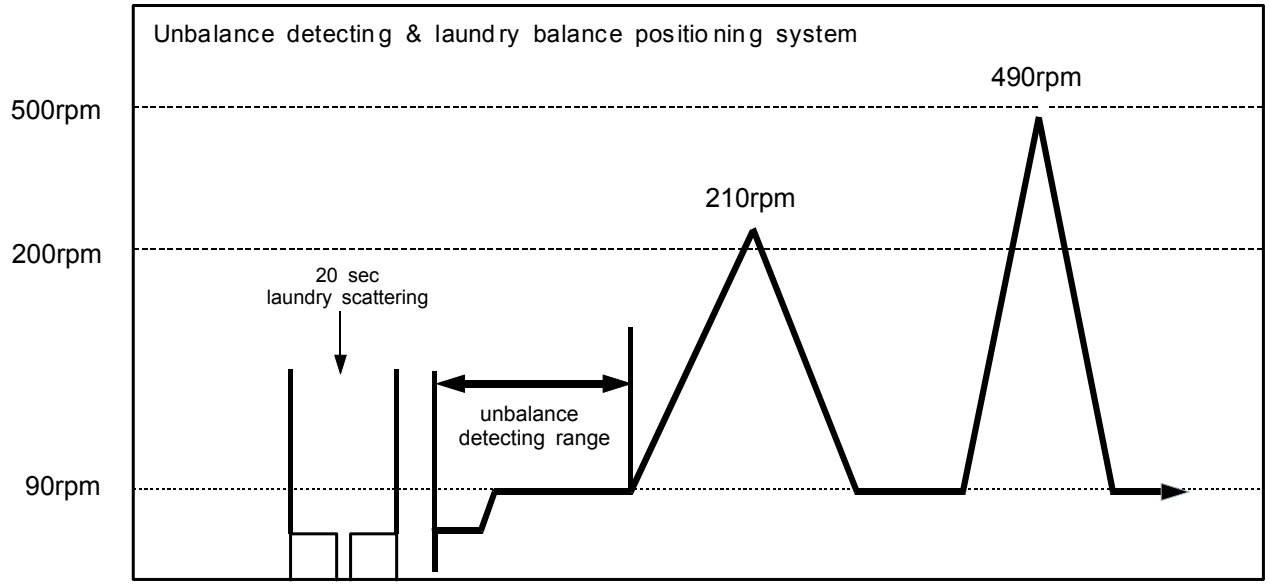
① Just before the hydrating process and just after reversal rotation for balancing laundry position, this function is carried out

② The initial 6 sec is the period of reversal rotation for balancing laundry position , Drum rotates 50rpm for initial 6 sec

③ Next 10 sec, the rotation increases the speed from 50 rpm to 90 rpm slowly

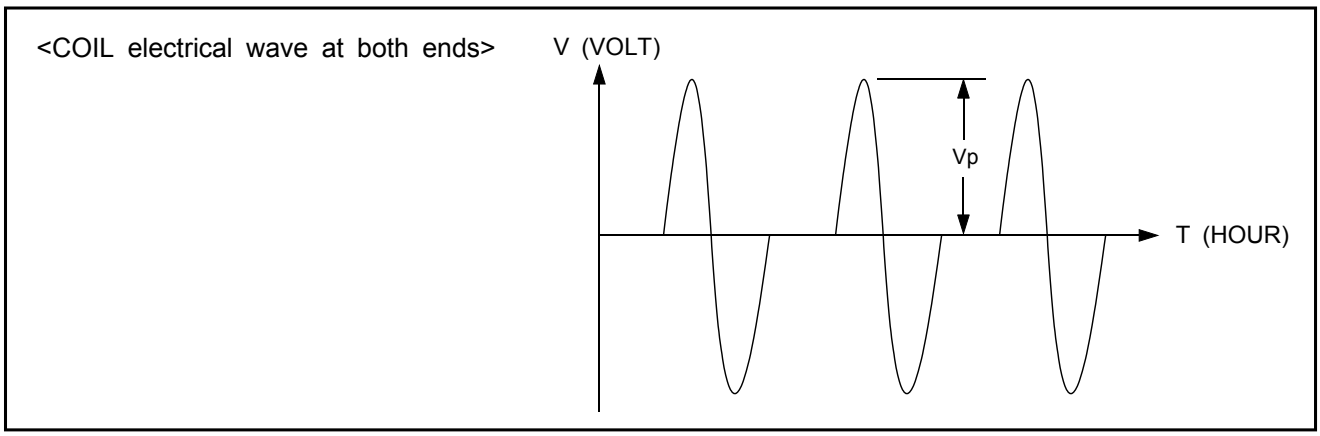
④ During the next 18 sec, drum rotates at the speed of 90 rpm, the sensor decides the degree of laundry unbalance with TACHO data which is attached to motor

⑤ If the degree of unbalanced laundry is over 6 times to default value, laundry balancing system carries out feed back process 6 times



13) R.P.M control

The rotating motor enables the magnetics(i.e generator) to generate magnetic flux in proportion to r.p.m, magnetic flux induced by coil sensor in the opposite side produces the wave like the figure below to $d\Phi/dt$ and via rectangual wave generating citcuit, the waves reaches MICOM and micom controls r.p.m with the pulse, count and cycle inputted by program.



6. Technical point

1) Motor on/off time at each course

unit:sec

Course	Washing				Motor r.p.m
	Cw	Off	Ccw	Off	
Cotton	13	4	13	4	52
Coloureds	12	8	12	8	50
Synthetics	7	8	7	8	40
Delicates	5	10	5	10	40
Wool	2	48	2	48	50
Handwash	2	58	2	58	50
Quick	12	8	12	8	50
Pre	10	10	10	10	50
B-Cotton	**8**	12	8	12	45
B-Coloureds	10	10	10	10	45
B-Delicates	5	10	5	10	40
B-Stain	10	10	10	10	45

※ Motor on/off time is measured in cold water, in heating time motor on/off time is 10 sec on and 5sec off in the cotton course, beside cotton course, in the other course motor on/off time is the same with that of cold water use.

2) Final dehydrating r.p.m at each course

unit:rpm

Model / Course	F1245AV	F1045A
Baby Cotton	1200	1000
Cotton	1200	1000
Coloureds	1200	1000
Synthetics	800	800
Delicates	800	600
Wools	400	400
Quick	1200	1000
Handwash	400	400
B-Cotton	1200	1000
B-Coloureds	1200	1000
B-Delicates	800	600
B-Stains	1200	1000

※ You can change the r.p.m to the above a table by use spin button under no spin situation.

6. Technical point

3) The water supply control at each process cycle

Model / Process cycle	F1245AV , F1045
Pre Washing	Cold water 5L/min
Washing	Cold water 10L/min + (Hot water 10L/min)
Rinse	Cold water 10L/min
Final rinse	Cold water 10L/min + Cold water 5L/min